It is noted that *Lymberopoulos et al.* merely suggests that a properly oriented magnetic field can be created so as to create a force on the charged particles moving horizontal to the work piece, thereby containing the plasma. It is also noted that *Lymberopoulos et al.* suggests that plasma density near the work piece can be increased while decreasing the plasma near the reactor ceiling or inductive window. (*Lymberopoulos et al.,* Col 10, line 9, 21) However, *Lymberopoulos et al.* does not demonstrate how the magnetic field can be used to achieve processing uniformity. Rather, the focus is on uneven charge build up. In any case, *Lymberopoulos et al.* teaches that the generated magnetic filed has lines of force the are perpendicular to the workpiece surface. Thus, clearly there is no teaching or suggestion in *Lymberopoulos et al.* with respect to an electromagnet arrangement being configured so as to result in a radial variation in a controlled magnetic field at different radial locations above said substrate within said plasma processing chamber in the region proximate to said coupling window and antenna when at least one direct current is supplied to said electromagnet arrangement. Accordingly, it is respectfully submitted that claim 31 is patenable over *Lymberopoulos* at least for this reason alone.

Further, the examiner has admited that there is no teaching in *Lymberopoulos et al.* with respect to gas chemistries used in the etching process. Firstly, it should be noted that the serious deficiencies of *Lymberopoulos et al.* cannot possibly be cured by *Hills et al.* since *Lymberopoulos et al.* does not even address the gas chemistries used in the etching process. Nevertheless, the Examiner proposes to combine the teaching of *Hills et al.* to overcome the deficiencies of *Lymberopoulos et al.* Accordingly, it is respectfully submitted that the Examiner has failed to establish a prima facie case of obviousness.

Still furthermore, contrary to the Examiner's assertion, there is no teaching in *Hills et al.* with respect to flowing a combination of gases, wherein two or more gases of the combination of gases is a $C_x F_y H_z O_w$ gas. In the Office Action, the Examiner asserts that use of specific fluorocarbons C_2F_6, C_3F_6 and C_4F_8 are taught by *Hills et al.* Again, it is respectfully submitted that the claim 31 recites use of two or more gases of the combination of gases is a $C_x F_y H_z O_w$ gas. *Hills et al.* does not teach using such a combination of reactant gases. Instead, *Hills et al.* teaches flowing an etching gas that includes a Fluorocarbon gas, a Nitrogen reactant gas, an Oxygen reactant gas, an inert carrier gas, and a Hydrogen containing additive gas into the plasma reactor. (*Hills et al.,* Abstract). Accordingly, it is respectfully submitted that the cited references taken alone or

in any proper combination do not teach or suggest these limitations. Accordingly, it is respectfully submitted that independent claim 31 is patentable over cited art for at least these reasons alone.

Again, it should also be noted, *Lymberopoulos et al.* and *Hills et al.* fail to teach other features of the claimed invention. For example, there is no teaching in *Lymberopoulos et al.* and *Hills et al.* with respect to changing the radial variation in a controlled magnetic field within a plasma processing chamber in a region proximate to an antenna to improve the processing uniformity across the substrate. In the Final Office Action, the Examiner states that this limitation is suggested by *Lymberopoulos et al.* since the need to eliminate uneven charging is the goal of the invention. And, since uneven charging is the result of non-uniform processing, the Examiner asserts that uniform processing of the substrate is suggested by *Lymberopoulos et al.* (Final Office Action, page 7). It is submitted that uniform processing is a desirable result. However, the Examiner needs to show that *Lymberopoulos et al.* teaches that uniform processing can be improved by changing the radial variation in a controlled magnetic field within a plasma processing chamber in a region proximate to an antenna to improve the processing uniformity across the substrate. Instead, the Examiner merely asserts that *Lymberopoulos et al.* suggests this feature since it suggests that controlling the magnetic field can reduce charge build up which is the result of non-uniform processing. It is earnestly believed that *Lymberopoulos et al.* does not teach changing the magnetic field in the context of the invention.

In view of the foregoing, it is respectfully submitted that the cited references taken alone or in any proper combination do not teach or suggest the claimed invention. Accordingly, it is respectfully submitted that independent claim 31 is patentable over the cited art for at least these reason alone. Furthermore, claims that depend on claim 31 are patentable over the cited art for at least the same reasons as discussed above. Moreover, the dependent claims recite additional features that render them patentable for additional reasons. Additional limitations recited in the independent claims or the dependent claims are not further discussed as the above-discussed limitations are clearly sufficient to distinguish the claimed invention from the cited art. Reconsideration of the application and an early Notice of Allowance are earnestly solicited.

If there are any issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner

is respectfully requested to contact the undersigned at the telephone number listed below. Applicants hereby petition for an extension of time which may be required to maintain the pendency of this case, and any required fee for such extension or any further fee required in connection with the filing of this Amendment is to be charged to Deposit Account No. 50-0388 (Order No. LAM1P128).

Respectfully submitted
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31. (Amended three times) A method for controlling processing uniformity while processing a substrate using a plasma-enhanced process, comprising:

providing a plasma processing chamber having a single chamber, substantially azimuthally symmetric configuration within which a plasma is both ignited and sustained during said processing of said substrate, said plasma processing chamber having no separate plasma generation chamber;

providing a coupling window disposed at an upper end of said plasma processing chamber;

providing an RF antenna arrangement disposed above a plane defined by said substrate when said substrate is disposed within said plasma processing chamber for said processing;

providing an electromagnet arrangement disposed above said plane defined by said substrate, said electromagnet arrangement being configured so as to result in a radial variation in the controlled magnetic field at different radial locations above said substrate within said plasma processing chamber in the region proximate to said coupling window and antenna when at least one direct current is supplied to said electromagnet arrangement, said radial variation being effective to affect density of said plasma in said region proximate to said coupling window and antenna;

providing a dc power supply coupled to said electromagnet arrangement;

placing said substrate into said plasma processing chamber;

flowing reactant gases into said plasma processing chamber, said reactant gases include a combination of gases, wherein two or more gases of said combination of gases included in said reactant gases is a $C_x F_y H_z O_w$ gas;

striking said plasma out of said reactant gases; [and]

changing said radial variation in said controlled magnetic field within said plasma processing chamber in said region proximate to said antenna to control said density of said plasma when said reactant gases are being flown in said plasma processing and thereby improving processing uniformity across said substrate chamber; and

wherein said different radial locations include at least one radial region which is not in an axial direction perpendicular to said direction.

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1	EXIN	3

Total number of pages: 3

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